

LIGHT WEIGHT RUBBER COMPOSITION CONTAINING CLAY

5 This is a divisional application of United States Patent Application Serial No. 10/002,870, filed on November 15, 2001, ^{now U.S. Patent 6,723,311,} which claims the benefit of United States Provisional Patent Application Serial No. 60/249,936 filed on November 17, 2000.

Background of the Invention

10 Tires are increasingly expected to provide higher and higher levels of performance characteristics. For instance, it is normally expected for tires to exhibit good traction characteristics on both dry and wet surfaces as well as low rolling resistance for good vehicle fuel economy. However, it has traditionally been very difficult to improve the traction characteristics of a tire without compromising its rolling resistance and treadwear. Low rolling resistance is important because good fuel economy is virtually always an important consideration. Reducing the weight of tires is 15 also a goal of automobile and truck manufacturers because reduced weight results in improved fuel economy. Reducing the weight of tires is of particular importance in the case of aircraft tires. Good treadwear is also an important consideration because it is generally the most important factor in determining the life of the tire.

20 The traction, treadwear and rolling resistance of a tire is dependent to a large extent on the dynamic viscoelastic properties of the elastomers utilized in making the tire tread. In order to reduce the rolling resistance of a tire, rubbers having a high rebound have traditionally been utilized in making the tire's tread. On the other hand, in order to increase the wet skid resistance of a tire, rubbers that undergo a large energy loss have generally been utilized in the tire tread. In order to balance these two viscoelastically 25 inconsistent properties, mixtures of various types of synthetic and natural rubber are normally utilized in tire treads. For instance, various mixtures of styrene-butadiene rubber and polybutadiene rubber are commonly used as a rubber material for automobile tire treads. However, such blends are not totally satisfactory for all purposes.

30 Rubbers having intermediate glass transition temperatures (-70°C to -40°C) compromise rolling resistance and treadwear without significantly increasing traction characteristics. For this reason, blends of rubbers having low glass transition temperatures and rubbers having high glass transition temperatures are frequently utilized to attain improved traction characteristics without significantly compromising